

LISTE DE SEQUENCES

<110> INSTITUT PASTEUR
INSTITUT PASTEUR DE TUNIS

<120> GENE ASSOCIE A LA VIRULENCE DU PARASITE LEISHMANIA

<130> B4866A -AD/VMA

<140>

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<150> FR 0107985

<151> 2001-06-18

<160> 10

<170> PatentIn Ver. 2.1

<210> 1

<211> 2094

<212> ADN

<213> Leishmania major

<220>

<221> CDS

<222> (241)..(1674)

<223> Séquence codante (orf) de la LmPDI

<400> 1

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agctgtgagc tgctgcctac tggcaacgtg tacgccattc ccgtttcttg attctgggtgc 180
agtgtctcgc tctaccctat ttgtattgat accgttttcc ttttcgtttt gcaaagaaaa 240
atg cag cgc tca ttc ctt gtt ttt gtt ctg tgc gcc ctt ctc ttc tgc 288
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Val Ala Ser Ala Glu Val Gln Val Ala Thr Lys Asp Asn Phe Asp Lys
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Val Val Ile Gly Asp Leu Thr Leu Val Lys Phe Tyr Ala Pro Trp Cys
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Gly His Cys Lys Thr Leu Ala Pro Glu Phe Val Lys Ala Ala Asp Met
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ctg gcc ggc atc gcg acc ctt gca gag gtc gat tgc acc aaa gaa gag 480
Leu Ala Gly Ile Ala Thr Leu Ala Glu Val Asp Cys Thr Lys Glu Glu
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 Phe Arg Asn Gly Glu Lys Val Lys Ile Tyr Asp Gly Pro Arg Thr Ala
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 Met Ile Thr Lys Val Ala Asp Ser Leu Arg Ser Gln Met Asn Phe Val
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 Leu Val Thr Asp Ala Ala Ile Ser Pro Asn Asp Ala Met Glu Ser Val
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 Thr Val Tyr Arg Lys Asn Ala Glu Arg Glu Ala Tyr Thr Gly Ala Thr
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cca atg acg gca gag tcg gtg aag agc ttt ctc acg agt gct gtg ttg 912
 Pro Met Thr Ala Glu Ser Val Lys Ser Phe Leu Thr Ser Ala Val Leu
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gac tac ttt ggc gag ctc ggc cag gag agc ttt cag aag tac atg gaa 960
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gat tct gcg ttg aag ggg tca ctt gtg gcg gtg gcg gag aag tac cgc 1056
 Asp Ser Ala Leu Lys Gly Ser Leu Val Ala Val Ala Glu Lys Tyr Arg
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acc tcc gag tct gtc gct gcg ttt gtg gag aag tat gtc aag ggc gag 1248
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 Asn Gly Leu Thr Thr Val Val Gly Gln Thr Phe Ala Lys Tyr Thr Asp
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 Gly Thr Gln Asn Val Met Leu Leu Phe Tyr Ala Pro Trp Cys Gly His
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 Cys Lys Lys Leu His Pro Val Tyr Asp Lys Val Ala Lys Ser Phe Glu
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tct gag aat gtg atc att gcg aag atg gat gcc acg acg aac gac ttt 1488
 Ser Glu Asn Val Ile Ile Ala Lys Met Asp Ala Thr Thr Asn Asp Phe
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 Asp Arg Glu Lys Phe Glu Val Ser Gly Phe Pro Thr Ile Tyr Phe Ile
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 Pro Ala Gly Lys Pro Pro Ile Val Tyr Glu Gly Gly Arg Thr Ala Asp
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 Glu Ile Gln Val Phe Val Lys Ser His Leu Thr Ala Ser Ala Ala Pro
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 <212> PRT
 <213> Leishmania major

<400> 2

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 35 40 45
 Gly His Cys Lys Thr Leu Ala Pro Glu Phe Val Lys Ala Ala Asp Met
 50 55 60
 Leu Ala Gly Ile Ala Thr Leu Ala Glu Val Asp Cys Thr Lys Glu Glu
 65 70 75 80
 Ser Leu Ala Glu Lys Tyr Glu Ile Lys Gly Phe Pro Thr Leu Tyr Ile
 85 90 95
 Phe Arg Asn Gly Glu Lys Val Lys Ile Tyr Asp Gly Pro Arg Thr Ala
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 Ala Gly Ile Ala Ser Tyr Met Lys Ala His Val Gly Pro Ser Met Lys
 115 120 125
 Ala Ile Ser Thr Ala Glu Glu Leu Glu Glu Leu Lys Lys Glu Thr Phe
 130 135 140
 Pro Val Cys Val Val Lys Thr Ala Ser Thr Asp Ser Glu Met Ala Ser
 145 150 155 160
 Met Ile Thr Lys Val Ala Asp Ser Leu Arg Ser Gln Met Asn Phe Val
 165 170 175
 Leu Val Thr Asp Ala Ala Ile Ser Pro Asn Asp Ala Met Glu Ser Val
 180 185 190
 Thr Val Tyr Arg Lys Asn Ala Glu Arg Glu Ala Tyr Thr Gly Ala Thr
 195 200 205
 Pro Met Thr Ala Glu Ser Val Lys Ser Phe Leu Thr Ser Ala Val Leu
 210 215 220
 Asp Tyr Phe Gly Glu Leu Gly Gln Glu Ser Phe Gln Lys Tyr Met Glu
 225 230 235 240
 Ala Asn Lys Asp Lys Pro Leu Gly Trp Val Phe Ile Asp Lys Asn Thr
 245 250 255
 Asp Ser Ala Leu Lys Gly Ser Leu Val Ala Val Ala Glu Lys Tyr Arg
 260 265 270
 Ser Gln Val Leu Leu Thr Tyr Ile Asp Gly Asp Gln Tyr Arg Pro Val
 275 280 285
 Ser Arg Gln Leu Gly Ile Pro Glu Asp Ala Lys Phe Pro Ala Phe Val
 290 295 300

Val Asp Phe Glu Arg Arg His His Val Met Gly Thr Asp Thr Pro Val
 305 310 315 320
 Thr Ser Glu Ser Val Ala Ala Phe Val Glu Lys Tyr Val Lys Gly Glu
 325 330 335
 Thr Lys Gln Thr Val Met Ser Asp Ala Ile Pro Ala Lys Glu Thr Val
 340 345 350
 Asn Gly Leu Thr Thr Val Val Gly Gln Thr Phe Ala Lys Tyr Thr Asp
 355 360 365
 Gly Thr Gln Asn Val Met Leu Leu Phe Tyr Ala Pro Trp Cys Gly His
 370 375 380
 Cys Lys Lys Leu His Pro Val Tyr Asp Lys Val Ala Lys Ser Phe Glu
 385 390 395 400
 Ser Glu Asn Val Ile Ile Ala Lys Met Asp Ala Thr Thr Asn Asp Phe
 405 410 415
 Asp Arg Glu Lys Phe Glu Val Ser Gly Phe Pro Thr Ile Tyr Phe Ile
 420 425 430
 Pro Ala Gly Lys Pro Pro Ile Val Tyr Glu Gly Gly Arg Thr Ala Asp
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<211> 467

<212> PRT

<213> Séquence artificielle

<220>

<223> Description de la séquence artificielle: protéine recombinante

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 Cys Lys Thr Leu Ala Pro Glu Phe Val Lys Ala Ala Asp Met Leu Ala
 35 40 45
 Gly Ile Ala Thr Leu Ala Glu Val Asp Cys Thr Lys Glu Glu Ser Leu
 50 55 60
 Ala Glu Lys Tyr Glu Ile Lys Gly Phe Pro Thr Leu Tyr Ile Phe Arg
 65 70 75 80

Asn Gly Glu Lys Val Lys Ile Tyr Asp Gly Pro Arg Thr Ala Ala Gly	85	90	95
Ile Ala Ser Tyr Met Lys Ala His Val Gly Pro Ser Met Lys Ala Ile	100	105	110
Ser Thr Ala Glu Glu Leu Glu Glu Leu Lys Lys Glu Thr Phe Pro Val	115	120	125
Cys Val Val Lys Thr Ala Ser Thr Asp Ser Glu Met Ala Ser Met Ile	130	135	140
Thr Lys Val Ala Asp Ser Leu Arg Ser Gln Met Asn Phe Val Leu Val	145	150	155
Thr Asp Ala Ala Ile Ser Pro Asn Asp Ala Met Glu Ser Val Thr Val	165	170	175
Tyr Arg Lys Asn Ala Glu Arg Glu Ala Tyr Thr Gly Ala Thr Pro Met	180	185	190
Thr Ala Glu Ser Val Lys Ser Phe Leu Thr Ser Ala Val Leu Asp Tyr	195	200	205
Phe Gly Glu Leu Gly Gln Glu Ser Phe Gln Lys Tyr Met Glu Ala Asn	210	215	220
Lys Asp Lys Pro Leu Gly Trp Val Phe Ile Asp Lys Asn Thr Asp Ser	225	230	235
Ala Leu Lys Gly Ser Leu Val Ala Val Ala Glu Lys Tyr Arg Ser Gln	245	250	255
Val Leu Leu Thr Tyr Ile Asp Gly Asp Gln Tyr Arg Pro Val Ser Arg	260	265	270
Gln Leu Gly Ile Pro Glu Asp Ala Lys Phe Pro Ala Phe Val Val Asp	275	280	285
Phe Glu Arg Arg His His Val Met Gly Thr Asp Thr Pro Val Thr Ser	290	295	300
Glu Ser Val Ala Ala Phe Val Glu Lys Tyr Val Lys Gly Glu Thr Lys	305	310	315
Gln Thr Val Met Ser Asp Ala Ile Pro Ala Lys Glu Thr Val Asn Gly	325	330	335
Leu Thr Thr Val Val Gly Gln Thr Phe Ala Lys Tyr Thr Asp Gly Thr	340	345	350
Gln Asn Val Met Leu Leu Phe Tyr Ala Pro Trp Cys Gly His Cys Lys	355	360	365
Lys Leu His Pro Val Tyr Asp Lys Val Ala Lys Ser Phe Glu Ser Glu	370	375	380
Asn Val Ile Ile Ala Lys Met Asp Ala Thr Thr Asn Asp Phe Asp Arg	385	390	395
			400

Glu Lys Phe Glu Val Ser Gly Phe Pro Thr Ile Tyr Phe Ile Pro Ala
 405 410 415

Gly Lys Pro Pro Ile Val Tyr Glu Gly Gly Arg Thr Ala Asp Glu Ile
 420 425 430

Gln Val Phe Val Lys Ser His Leu Thr Ala Ser Ala Ala Pro Ser Gly
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Gly Pro Ser Gly Asn Ser Glu Glu Asp Leu Leu Glu His His His
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His His His
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<212> PRT

<213> T. brucei

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 35 40 45

Gly Tyr Cys Gln Met Leu Ala Pro Glu Trp Glu Lys Ala Ala Asn Glu
 50 55 60

Thr Ile Asp Asn Ala Leu Met Gly Glu Val Asp Cys His Ser Gln Pro
 65 70 75 80

Glu Leu Ala Ala Asn Phe Ser Ile Arg Gly Tyr Pro Thr Ile Ile Leu
 85 90 95

Phe Arg Asn Gly Lys Glu Ala Glu His Tyr Gly Gly Ala Arg Thr Lys
 100 105 110

Asp Asp Ile Ile Lys Tyr Ile Lys Ala Asn Val Gly Pro Ala Val Thr
 115 120 125

Pro Ala Ser Asn Ala Glu Glu Val Thr Arg Ala Lys Glu Glu His Asp
 130 135 140

Val Val Cys Val Gly Leu Thr Ala Asn Asn Ser Thr Ser Leu Ser Thr
 145 150 155 160

Thr Leu Ala Glu Ala Ala Gln Ser Phe Arg Val Ser Leu Lys Phe Phe
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Glu Ala Glu Pro Lys Leu Phe Pro Asp Glu Lys Pro Glu Thr Ile Val
 180 185 190

Val Tyr Arg Lys Gly Gly Glu Lys Glu Val Tyr Asp Gly Pro Met Glu
 195 200 205
 Val Glu Lys Leu Thr Glu Phe Leu Gln Ile Ser Arg Val Ala Phe Gly
 210 215 220
 Gly Glu Ile Thr Pro Glu Asn Tyr Gln Tyr Tyr Ser Val Ile Lys Arg
 225 230 235 240
 Pro Val Gly Trp Ala Met Val Lys Pro Asn Glu Thr Ala Ser Ile Glu
 245 250 255
 Leu Lys Glu Ser Leu Thr Glu Val Gly Lys Lys Met Arg Ser His Met
 260 265 270
 Val Val Leu Trp Val Asn Ile Ser Lys His Pro Val Trp Arg Asp Phe
 275 280 285
 Gly Val Pro Glu Asp Ala Lys Tyr Pro Ala Phe Leu Ala Ile His Trp
 290 295 300
 Gly Ala Asn Tyr Leu His Ser Thr Ala Glu Val Val Thr Arg Glu Ser
 305 310 315 320
 Leu Glu Lys Phe Ile Leu Glu Phe Ala Ala Gly Arg Val Glu Pro Thr
 325 330 335
 Ile Lys Ser Leu Pro Val Pro Glu Val Glu Thr Val Asp Gly Lys Thr
 340 345 350
 Thr Ile Val Ala Lys Thr Met Gln Lys His Leu Thr Ser Gly Lys Asp
 355 360 365
 Met Leu Ile Leu Phe Phe Ala Pro Trp Cys Gly His Cys Lys Asn Phe
 370 375 380
 Ala Pro Thr Phe Asp Lys Ile Ala Lys Glu Phe Asp Ala Thr Asp Leu
 385 390 395 400
 Ile Val Ala Glu Leu Asp Ala Thr Ala Asn Tyr Val Asn Ser Ser Thr
 405 410 415
 Phe Thr Val Thr Ala Phe Pro Thr Val Phe Phe Val Pro Asn Gly Gly
 420 425 430
 Lys Pro Val Val Phe Glu Gly Glu Arg Ser Phe Glu Asn Val Tyr Glu
 435 440 445
 Phe Val Arg Lys His Val Thr Thr Phe Lys Val Ser Glu Lys Pro Ala
 450 455 460
 Asn Val Thr Glu Glu Lys Lys Ser Glu Glu Glu Asn Lys Ser Ser Lys
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 Leu

<210> 5
 <211> 502
 <212> PRT
 <213> H. jecorina

<400> 5

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Asn Asp Phe Ile Asn Ser Asn Asp Leu Val Leu Ala Glu Ser Phe Ala
          35          40          45

Pro Trp Cys Gly His Cys Lys Ala Leu Ala Pro Glu Tyr Glu Glu Ala
          50          55          60

Ala Thr Thr Leu Lys Asp Lys Ser Ile Lys Leu Ala Lys Val Asp Cys
          65          70          75          80

Val Glu Glu Ala Asp Leu Cys Lys Glu His Gly Val Glu Gly Tyr Pro
          85          90          95

Thr Leu Lys Val Phe Arg Gly Leu Asp Lys Val Ala Pro Tyr Thr Gly
          100          105          110

Pro Arg Lys Ala Asp Gly Ile Thr Ser Tyr Met Val Lys Gln Ser Leu
          115          120          125

Pro Ala Val Ser Ala Leu Thr Lys Asp Thr Leu Glu Asp Phe Lys Thr
          130          135          140

Ala Asp Lys Val Val Leu Val Ala Tyr Ile Ala Ala Asp Asp Lys Ala
          145          150          155          160

Ser Asn Glu Thr Phe Thr Ala Leu Ala Asn Glu Leu Arg Asp Thr Tyr
          165          170          175

Leu Phe Gly Gly Val Asn Asp Ala Ala Val Ala Glu Ala Glu Gly Val
          180          185          190

Lys Phe Pro Ser Ile Val Leu Tyr Lys Ser Phe Asp Glu Gly Lys Asn
          195          200          205

Val Phe Ser Glu Lys Phe Asp Ala Glu Ala Ile Arg Asn Phe Ala Gln
          210          215          220

Val Ala Ala Thr Pro Leu Val Gly Glu Val Gly Pro Glu Thr Tyr Ala
          225          230          235          240

Gly Tyr Met Ser Ala Gly Ile Pro Leu Ala Tyr Ile Phe Ala Glu Thr
          245          250          255

Ala Glu Glu Arg Glu Asn Leu Ala Lys Thr Leu Lys Pro Val Ala Glu
          260          265          270
  
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 290 295 300
 Phe Ala Ile His Asp Ile Glu Lys Asn Leu Lys Phe Pro Phe Asp Gln
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 Ser Lys Glu Ile Thr Glu Lys Asp Ile Ala Ala Phe Val Asp Gly Phe
 325 330 335
 Ser Ser Gly Lys Ile Glu Ala Ser Ile Lys Ser Glu Pro Ile Pro Glu
 340 345 350
 Thr Gln Glu Gly Pro Val Thr Val Val Val Ala His Ser Tyr Lys Asp
 355 360 365
 Ile Val Leu Asp Asp Lys Lys Asp Val Leu Ile Glu Phe Tyr Thr Pro
 370 375 380
 Trp Cys Gly His Cys Lys Ala Leu Ala Pro Lys Tyr Asp Glu Leu Ala
 385 390 395 400
 Ser Leu Tyr Ala Lys Ser Asp Phe Lys Asp Lys Val Val Ile Ala Lys
 405 410 415
 Val Asp Ala Thr Ala Asn Asp Val Pro Asp Glu Ile Gln Gly Phe Pro
 420 425 430
 Thr Ile Lys Leu Tyr Pro Ala Gly Asp Lys Lys Asn Pro Val Thr Tyr
 435 440 445
 Ser Gly Ala Arg Thr Val Glu Asp Phe Ile Glu Phe Ile Lys Glu Asn
 450 455 460
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 Glu Thr His Asp Glu Leu
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35 40 45

Cys Gly His Cys Lys Lys Ile Ala Pro Glu Tyr Glu Arg Ala Ala Pro
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Lys Leu Ala Ser Asn Asp Pro Pro Val Ala Leu Val Lys Val Asp Cys
65 70 75 80

Thr Thr Glu Lys Thr Val Cys Asp Lys Phe Gly Val Lys Gly Phe Pro
85 90 95

Thr Leu Lys Ile Phe Arg Asn Gly Val Pro Ala Gln Asp Tyr Asp Gly
100 105 110

Pro Arg Asp Ala Asp Gly Ile Val Lys Phe Met Arg Gly Gln Ser Gly
115 120 125

Pro Ser Ser Lys Glu Leu Lys Thr Val Ala Glu Phe Glu Lys Phe Thr
130 135 140

Gly Gly Asp Glu Asn Val Val Ile Gly Phe Phe Glu Ser Glu Ser Lys
145 150 155 160

Leu Lys Asp Ser Tyr Leu Lys Val Ala Asp Thr Glu Arg Asp Arg Phe
165 170 175

Ser Phe Ala His Thr Ser Asn Lys Asp Ile Ile Lys Lys Ala Gly Tyr
180 185 190

Ser Asp Asp Val Val Val Phe Val Pro Lys Lys Leu His Asn Lys Phe
195 200 205

Asp Thr Asn Glu Phe Lys Tyr Asp Gly Asn Tyr Asp Thr Asp Lys Ile
210 215 220

Lys Asn Phe Leu Val His Glu Thr Val Gly Phe Ala Gly Ile Arg Thr
225 230 235 240

Gln Gly Asn Leu Phe Gln Phe Glu Gln Lys Pro Ile Val Ile Val Tyr
245 250 255

Tyr Asn Val Asp Tyr Val Lys Asp Pro Lys Gly Ser Asn Tyr Trp Arg
260 265 270

Asn Arg Val Leu Lys Val Ala Gln Asn Tyr Lys Arg Lys Val Gln Phe
275 280 285

Ala Val Ser Asn Lys Glu Glu Phe Ser Ser Glu Ile Glu Thr Asn Gly
290 295 300

Leu Gly Glu Arg Lys Asp Ser Asp Lys Pro Ile Val Ala Ile Leu Thr
305 310 315 320

Asn Glu Gly Lys Tyr Pro Met Asp Gln Glu Phe Ser Val Asp Asn Leu
325 330 335

Gln Gln Phe Val Asp Glu Val Leu Ala Gly Asn Ala Glu Pro Tyr Met
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Lys Ser Glu Pro Ile Pro Asp Glu Gln Gly Asp Val Lys Val Ala Val
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Gly Lys Asn Phe Lys Glu Leu Ile Met Asp Ala Asp Lys Asp Val Leu
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Lys Tyr Glu Glu Leu Ala Glu Lys Leu Asn Lys Glu Asp Val Ile Ile
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Ala Lys Met Asp Ala Thr Ala Asn Asp Val Pro Pro Met Phe Glu Val
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Arg Gly Phe Pro Thr Leu Phe Trp Leu Pro Lys Asn Ala Lys Ser Asn
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Pro Ile Pro Tyr Asn Gly Gly Arg Glu Val Lys Asp Phe Val Ser Phe
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Lys Lys Lys Lys Lys Thr Glu Leu
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<212> PRT

<213> C. reinhard

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 35 40 45

Val Asp Val Thr Val Val Thr Val Lys Asn Trp Asp Glu Thr Val Lys
 50 55 60

Lys Ser Lys Phe Ala Leu Val Glu Phe Tyr Ala Pro Trp Cys Gly His
 65 70 75 80

Cys Lys Thr Leu Lys Pro Glu Tyr Ala Lys Ala Ala Thr Ala Leu Lys
 85 90 95

Ala Ala Ala Pro Asp Ala Leu Ile Ala Lys Val Asp Ala Thr Gln Glu
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Glu Ser Leu Ala Gln Lys Phe Gly Val Gln Gly Tyr Pro Thr Leu Lys
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Trp Phe Val Asp Gly Glu Leu Ala Ser Asp Tyr Asn Gly Pro Arg Asp
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 Ala Asp Gly Ile Val Gly Trp Val Lys Lys Lys Thr Gly Pro Pro Ala
 145 150 155 160
 Val Thr Val Glu Asp Ala Asp Lys Leu Lys Ser Leu Glu Ala Asp Ala
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 Glu Val Val Val Val Gly Tyr Phe Lys Ala Leu Glu Gly Glu Ile Tyr
 180 185 190
 Asp Thr Phe Lys Ser Tyr Ala Ala Lys Thr Glu Asp Val Val Phe Val
 195 200 205
 Gln Thr Thr Ser Ala Asp Val Ala Lys Ala Ala Gly Leu Asp Ala Val
 210 215 220
 Asp Thr Val Ser Val Val Lys Asn Phe Ala Gly Glu Asp Arg Ala Thr
 225 230 235 240
 Ala Val Leu Ala Thr Asp Ile Asp Thr Asp Ser Leu Thr Ala Phe Val
 245 250 255
 Lys Ser Glu Lys Met Pro Pro Thr Ile Glu Phe Asn Gln Lys Asn Ser
 260 265 270
 Asp Lys Ile Phe Asn Ser Gly Ile Asn Lys Gln Leu Ile Leu Trp Thr
 275 280 285
 Thr Ala Asp Asp Leu Lys Ala Asp Ala Glu Ile Met Thr Val Phe Arg
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 Glu Ala Ser Lys Lys Phe Lys Gly Gln Leu Val Phe Val Thr Val Asn
 305 310 315 320
 Asn Glu Gly Asp Gly Ala Asp Pro Val Thr Asn Phe Phe Gly Leu Lys
 325 330 335
 Gly Ala Thr Ser Pro Val Leu Leu Gly Phe Phe Met Glu Lys Asn Lys
 340 345 350
 Lys Phe Arg Met Glu Gly Glu Phe Thr Ala Asp Asn Val Ala Lys Phe
 355 360 365
 Ala Glu Ser Val Val Asp Gly Thr Ala Gln Ala Val Leu Lys Ser Glu
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 Ala Ile Pro Glu Asp Pro Tyr Glu Asp Gly Val Tyr Lys Ile Val Gly
 385 390 395 400
 Lys Thr Val Glu Ser Val Val Leu Asp Glu Thr Lys Asp Val Leu Leu
 405 410 415
 Glu Val Tyr Ala Pro Trp Cys Gly His Cys Lys Lys Leu Glu Pro Ile
 420 425 430
 Tyr Lys Lys Leu Ala Lys Arg Phe Lys Lys Val Asp Ser Val Ile Ile
 435 440 445

Ala Lys Met Asp Gly Thr Glu Asn Glu His Pro Glu Ile Glu Val Lys
 450 455 460

Gly Phe Pro Thr Ile Leu Phe Tyr Pro Ala Gly Ser Asp Arg Thr Pro
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Ile Val Phe Glu Gly Gly Asp Arg Ser Leu Lys Ser Leu Thr Lys Phe
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Ile Lys Thr Asn Ala Lys Ile Pro Tyr Glu Leu Pro Lys Lys Gly Ser
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Lys Asp Glu Leu
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 <213> D. melano

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Val Glu Phe Tyr Ala Pro Trp Cys Gly His Cys Lys Ala Leu Ala Pro
 50 55 60

Glu Tyr Ala Lys Ala Ala Gln Gln Leu Ala Glu Lys Glu Ser Pro Ile
 65 70 75 80

Lys Leu Ala Lys Val Asp Ala Thr Val Glu Gly Glu Leu Ala Glu Gln
 85 90 95

Tyr Ala Val Arg Gly Tyr Pro Thr Leu Lys Phe Phe Arg Ser Gly Ser
 100 105 110

Pro Val Glu Tyr Ser Gly Gly Arg Gln Ala Ala Asp Ile Ile Ala Trp
 115 120 125

Val Thr Lys Lys Thr Gly Pro Pro Ala Lys Asp Leu Thr Ser Val Ala
 130 135 140

Asp Ala Glu Gln Phe Leu Lys Asp Asn Glu Ile Ala Ile Ile Gly Phe
 145 150 155 160

Phe Lys Asp Leu Glu Ser Glu Glu Ala Lys Thr Phe Thr Lys Val Ala
 165 170 175

Asn Ala Leu Asp Ser Phe Val Phe Gly Val Ser Ser Asn Ala Asp Val
 180 185 190
 Ile Ala Lys Tyr Glu Ala Lys Asp Asn Gly Val Val Leu Phe Lys Pro
 195 200 205
 Phe Asp Asp Lys Lys Ser Val Phe Glu Gly Glu Leu Asn Glu Glu Asn
 210 215 220
 Leu Lys Lys Phe Ala Gln Val Gln Ser Leu Pro Leu Ile Val Asp Phe
 225 230 235 240
 Asn His Glu Ser Ala Ser Lys Ile Phe Gly Gly Ser Ile Lys Ser His
 245 250 255
 Leu Leu Phe Phe Val Ser Arg Glu Gly Gly His Ile Glu Lys Tyr Val
 260 265 270
 Asp Pro Leu Lys Glu Ile Ala Lys Lys Tyr Arg Asp Asp Ile Leu Phe
 275 280 285
 Val Thr Ile Ser Ser Asp Glu Glu Asp His Thr Arg Ile Phe Glu Phe
 290 295 300
 Phe Gly Met Asn Lys Glu Glu Val Pro Thr Ile Arg Leu Ile Lys Leu
 305 310 315 320
 Glu Glu Asp Met Ala Lys Tyr Lys Pro Glu Ser Asp Asp Leu Ser Ala
 325 330 335
 Glu Thr Ile Glu Ala Phe Leu Lys Lys Phe Leu Asp Gly Lys Leu Lys
 340 345 350
 Gln His Leu Leu Ser Gln Glu Leu Pro Glu Asp Trp Asp Lys Asn Pro
 355 360 365
 Val Lys Val Leu Val Ser Ser Asn Phe Glu Ser Val Ala Leu Asp Lys
 370 375 380
 Ser Lys Ser Val Leu Val Glu Phe Tyr Ala Pro Trp Cys Gly His Cys
 385 390 395 400
 Lys Gln Leu Ala Pro Ile Tyr Asp Gln Leu Ala Glu Lys Tyr Lys Asp
 405 410 415
 Asn Glu Asp Ile Val Ile Ala Lys Met Asp Ser Thr Ala Asn Glu Leu
 420 425 430
 Glu Ser Ile Lys Ile Ser Ser Phe Pro Thr Ile Lys Tyr Phe Arg Lys
 435 440 445
 Glu Asp Asn Lys Val Ile Asp Phe Asn Leu Asp Arg Thr Leu Asp Asp
 450 455 460
 Phe Val Lys Phe Leu Asp Ala Asn Gly Glu Val Ala Asp Ser Glu Pro
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 Val Glu Glu Thr Glu Glu Glu Glu Glu Ala Pro Lys Lys Asp Glu Leu
 485 490 495

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<400> 9

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Cys Leu Ser Lys Val Val Leu Gly Gly Asp Glu Ala His Phe Ile Ser
 20 25 30

Glu His Ile Thr Ser Leu Thr Ser Ser Asn Phe Glu Asp Phe Ile Lys
 35 40 45

Ser Lys Glu His Val Ile Val Thr Phe Phe Ala Pro Trp Cys Gly His
 50 55 60

Cys Thr Ala Leu Glu Pro Glu Phe Lys Ala Thr Cys Ala Glu Ile Ser
 65 70 75 80

Lys Leu Ser Pro Pro Val His Cys Gly Ser Val Asp Ala Thr Glu Asn
 85 90 95

Met Glu Leu Ala Gln Gln Tyr Gly Val Ser Gly Tyr Pro Thr Ile Lys
 100 105 110

Phe Phe Ser Gly Ile Asp Ser Val Gln Asn Tyr Ser Gly Ala Arg Ser
 115 120 125

Lys Asp Ala Phe Ile Lys Tyr Ile Lys Lys Leu Thr Gly Pro Ala Val
 130 135 140

Gln Val Ala Glu Ser Glu Glu Ala Ile Lys Thr Ile Phe Ala Ser Ser
 145 150 155 160

Ser Ser Ala Phe Val Gly Arg Phe Thr Ser Lys Asp Ser Ala Glu Tyr
 165 170 175

Ala Val Phe Glu Lys Val Ala Ser Gly His Arg Glu His Asn Tyr Ala
 180 185 190

Phe Ile Ala Phe Phe Gln Glu Gly Glu Gln Lys Leu Glu Val Leu His
 195 200 205

Lys Asp Glu Glu Pro Val Ser Leu Pro Met Pro Lys Thr Val Glu Glu
 210 215 220

Leu Glu Ala Lys Ile Ser Ile Met Asn Val Pro Leu Phe Ser Ala Ile
 225 230 235 240

Ser Ala Glu Asn Tyr Ser Leu Tyr Met Ser Arg Glu Gly Tyr Thr Pro
 245 250 255

Gly Ser Val Val Leu Thr Arg Thr Ser Pro Ser Met Leu Gln Thr Leu
 260 265 270
 Glu Arg Leu Gln Leu Ile Thr Glu Lys Ser Met Pro Leu Phe Ser Leu
 275 280 285
 Asp Thr Glu Gln Phe Gly Ser His Ala Thr Gln His Leu Leu Ile Glu
 290 295 300
 Lys Phe Pro Gly Leu Val Ile Gln Ser Val Asn Val Pro Ser Ile Arg
 305 310 315 320
 Tyr Met Tyr Gly Pro Ala Lys Phe Asp Ser Val Glu Pro Leu Lys Glu
 325 330 335
 Phe Met Lys Gln Val Ser Glu Gly Lys His Glu Leu Ser Ile Lys Ser
 340 345 350
 Glu Pro Ile Pro Ala Glu Gln Ser Gly Pro Val Thr Val Val Val Gly
 355 360 365
 Lys Thr Phe Glu Glu Ile Val Phe Arg Ser Asp Lys Asp Val Leu Leu
 370 375 380
 Glu Ile Tyr Ala Gln Trp Cys Gly His Cys Lys Asn Leu Glu Pro Ile
 385 390 395 400
 Tyr Asn Gln Leu Gly Glu Glu Tyr Lys Asp Asn Asp Lys Val Val Ile
 405 410 415
 Ala Lys Ile Asn Gly Pro Gln Asn Asp Ile Pro Tyr Glu Gly Phe Ser
 420 425 430
 Pro Arg Ala Phe Pro Thr Ile Leu Phe Val Lys Ala Gly Thr Arg Thr
 435 440 445
 Pro Ile Pro Tyr Asp Gly Lys Arg Thr Val Glu Ala Phe Lys Glu Phe
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 Ile Ser Glu His Ser Ser Phe Pro Gln Glu Lys Glu Ser Arg Asp Glu
 465 470 475 480
 Leu

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 <212> PRT
 <213> Homo sapiens

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 20 25 30

Asn Phe Ala Glu Ala Leu Ala Ala His Lys Tyr Leu Leu Val Glu Phe
 35 40 45
 Tyr Ala Pro Trp Cys Gly His Cys Lys Ala Leu Ala Pro Glu Tyr Ala
 50 55 60
 Lys Ala Ala Gly Lys Leu Lys Ala Glu Gly Ser Glu Ile Arg Leu Ala
 65 70 75 80
 Lys Val Asp Ala Thr Glu Glu Ser Asp Leu Ala Gln Gln Tyr Gly Val
 85 90 95
 Arg Gly Tyr Pro Thr Ile Lys Phe Phe Arg Asn Gly Asp Thr Ala Ser
 100 105 110
 Pro Lys Glu Tyr Thr Ala Gly Arg Glu Ala Asp Asp Ile Val Asn Trp
 115 120 125
 Leu Lys Lys Arg Thr Gly Pro Ala Ala Thr Thr Leu Pro Asp Gly Ala
 130 135 140
 Ala Ala Glu Ser Leu Val Glu Ser Ser Glu Val Ala Val Ile Gly Phe
 145 150 155 160
 Phe Lys Asp Val Glu Ser Asp Ser Ala Lys Gln Phe Leu Gln Ala Ala
 165 170 175
 Glu Ala Ile Asp Asp Ile Pro Phe Gly Ile Thr Ser Asn Ser Asp Val
 180 185 190
 Phe Ser Lys Tyr Gln Leu Asp Lys Asp Gly Val Val Leu Phe Lys Lys
 195 200 205
 Phe Asp Glu Gly Arg Asn Asn Phe Glu Gly Glu Val Thr Lys Glu Asn
 210 215 220
 Leu Leu Asp Phe Ile Lys His Asn Gln Leu Pro Leu Val Ile Glu Phe
 225 230 235 240
 Thr Glu Gln Thr Ala Pro Lys Ile Phe Gly Gly Glu Ile Lys Thr His
 245 250 255
 Ile Leu Leu Phe Leu Pro Lys Ser Val Ser Asp Tyr Asp Gly Lys Leu
 260 265 270
 Ser Asn Phe Lys Thr Ala Ala Glu Ser Phe Lys Gly Lys Ile Leu Phe
 275 280 285
 Ile Phe Ile Asp Ser Asp His Thr Asp Asn Gln Arg Ile Leu Glu Phe
 290 295 300
 Phe Gly Leu Lys Lys Glu Glu Cys Pro Ala Val Arg Leu Ile Thr Leu
 305 310 315 320
 Glu Glu Glu Met Thr Lys Tyr Lys Pro Glu Ser Glu Glu Leu Thr Ala
 325 330 335
 Glu Arg Ile Thr Glu Phe Cys His Arg Phe Leu Glu Gly Lys Ile Lys
 340 345 350

Pro His Leu Met Ser Gln Glu Leu Pro Glu Asp Trp Asp Lys Gln Pro
355 360 365

Val Lys Val Leu Val Gly Lys Asn Phe Glu Asp Val Ala Phe Asp Glu
370 375 380

Lys Lys Asn Val Phe Val Glu Phe Tyr Ala Pro Trp Cys Gly His Cys
385 390 395 400

Lys Gln Leu Ala Pro Ile Trp Asp Lys Leu Gly Glu Thr Tyr Lys Asp
405 410 415

His Glu Asn Ile Val Ile Ala Lys Met Asp Ser Thr Ala Asn Glu Val
420 425 430

Glu Ala Val Lys Val His Ser Phe Pro Thr Leu Lys Phe Phe Pro Ala
435 440 445

Ser Ala Asp Arg Thr Val Ile Asp Tyr Asn Gly Glu Arg Thr Leu Asp
450 455 460

Gly Phe Lys Lys Phe Leu Glu Ser Gly Gly Gln Asp Gly Ala Gly Asp
465 470 475 480

Asp Asp Asp Leu Glu Asp Leu Glu Glu Ala Glu Glu Pro Asp Met Glu
485 490 495

Glu Asp Asp Asp Gln Lys Ala Val Lys Asp Glu Leu
500 505